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## Annual Report

### "Creating the Public Connection - Real-time Experiences with Earth and Space Science Data"

#### NASA Grant NAG5-2689

The purpose of this grant is to bring real-time NASA data and imagery to the public principally by means of interactive real-time computer modules, planetarium shows and online Challenger Center missions. In addition, we bring to the public web-accessible material, summer science camps, public courses and lecture series, and other internet-based activities. We are delighted that we have been able to accomplish the first and often second and third versions of each of these types of programs. We estimate that we have reached over 100,000 in-person customers (at the museum kiosks, planetarium shows, summer courses, etc.) and over 100,000 visitors to our web sites. Our museum software is at present running in six online computer modules (four at the Houston Museum of Natural Science and two at the Austin Children's Museum.) Over forty of our preview CD's are in the hands of teachers. Two of the modules have been extensively reviewed by RSPAC and we are incorporating teacher suggestions and RSPAC suggestions in the next version of the software.

In keeping with the online nature of this grant, we are keeping all of our materials describing this project in online, web-accessible format. Attached are copies of the present version of the online material.

Here are the web sites and titles of the attached material:

<a href="http://space.rice.edu/hmns/">http://space.rice.edu/hmns/</a>	"Welcome to the Public Connection" (main project page, most links)
<a href="http://space.rice.edu/hmns/about_connect.html">http://space.rice.edu/hmns/about_connect.html</a>	"About the Public Connection" (details about each module, people)
<a href="http://space.rice.edu/hmns/summary.html">http://space.rice.edu/hmns/summary.html</a>	"Highlights of 1995" (milestones, accomplishments)
<a href="http://space.rice.edu/hmns/dlt/news.html">http://space.rice.edu/hmns/dlt/news.html</a>	"Public Connection in the News" (news clippings, TV segments)
<a href="http://space.rice.edu/hmns/dlt/metrics.html">http://space.rice.edu/hmns/dlt/metrics.html</a>	"Metrics of Success" (analysis of kiosk logs, paid customers)
<a href="http://space.rice.edu/hmns/dlt/video.html">http://space.rice.edu/hmns/dlt/video.html</a>	"Ask-the-Scientist Videoconferences" (how to participate by Cu-SeeMe)
<a href="http://space.rice.edu/hmns/dlt/videosched.html">http://space.rice.edu/hmns/dlt/videosched.html</a>	"Videoconference Schedule" (schedule of upcoming conferences)
<a href="http://space.rice.edu/hmns/dlt/upcoming.html">http://space.rice.edu/hmns/dlt/upcoming.html</a>	"Upcoming Activities" (planned activities for 1996)

Several of these have links to more material, as well. We will attempt to keep the summary page up to date so that a consistent status of the project can be retrieved at any time.



## WELCOME TO THE "PUBLIC CONNECTION"

### *"Earth views of Space and Space views of Earth"*

An Outreach of Rice University  
In partnership with the Houston Museum of Natural Science

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The Department of Space Physics and Astronomy at Rice University is "Creating the Public Connection" by means of a grant from NASA. The project has created the first digital museum accessible to the general public, by constructing four interactive displays of real-time earth and space science data at the Houston Museum of Natural Science (HMNS). This effort is part of NASA/Goddard's Digital Library Technology Project.

Project Director: Patricia Reiff  
Co-Director: Tamara Ledley  
Co-Director: Carolyn Sumners (HMNS)  
Ryan Wyatt (HMNS)

Chief Designers: Colin Law  
Colin McKay



### Ask-the-Scientist Internet Videoconferences!

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[ABOUT THE PUBLIC CONNECTION](#) | [FIRST YEAR ACCOMPLISHMENTS](#) | [OUR PROJECT IN THE NEWS](#)

## Museum Module Samplers:

[Comet Shoemaker-Levy 9](#)  
[Welcome to Planet Earth](#)  
[Space Weather](#)  
[Houston Today](#)  
[Space Update](#)

*Note:* Our programs are written in Macromedia Director, a very robust multimedia display language. These web versions are abbreviated, just to give our web visitors a taste of what we are showing at the museum. Contact us for full versions for your site!

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## Why don't we use a web browser for our museum display?

- Museum visitors (mostly school-age children) have a very short attention span, and would not wait for images and movies to be downloaded over the net - we have all imagery available online all the time, and update them automatically in the background. Sound and quicktime movies play quickly and automatically. Our visitors never see a "try again later" message!
- A web-based system would require keyboards, which we find have very short lifetimes when used unattended by hordes of school children (over a million a year visit HMNS). Our kiosks are all "point and click" or touchscreen.
- Present web browsers have no automatic safeguards for preventing school children from accessing pornographic or frivolous web sites - it would thus require an attendant.
- Present web browsers have no automatic return to home page after a time out - users can get lost in cyberspace. Our modules return gracefully to their home page after a time out.

ABOUT THE PUBLIC CONNECTION | FIRST YEAR ACCOMPLISHMENTS | OUR PROJECT IN THE NEWS

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According to the Web Counter folks you are visitor number **6 4 0**

(it only counts folks with image downloads turned on) since 1 January 1996. (The number may take a few seconds to show up... or may be "BUSY"!)

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[connect@space.rice.edu](mailto:connect@space.rice.edu)





## About the "Public Connection" Project

*"Earth views of Space and Space views of Earth"*

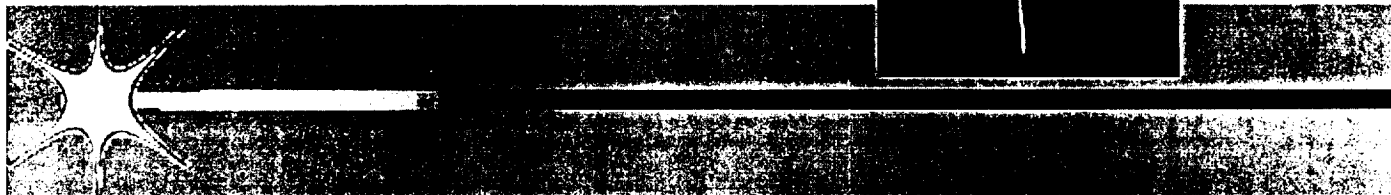
An Outreach of Rice University

In partnership with the Houston Museum of Natural Science

We have "Created the Public Connection" by inventing interactive real-time displays of real-time earth and space science data. The project is a collaboration with the Houston Museum of Natural Science (HMNS). This project is funded by NASA/Goddard's Digital Library Technology Project.



Our logo, a 6-pointed star, is created from interlocking triangles. The silver triangle symbolizes observing space from the Earth (the bottom point is man with two upward arms reaching to the solar system on the left and the galaxy and beyond on the right). The blue triangle symbolizes observing Earth from space (the top point is a spacecraft viewing down to observe the geosphere and biosphere below).



Visitors to "Space Update" in the Museum Grand Entry Hall

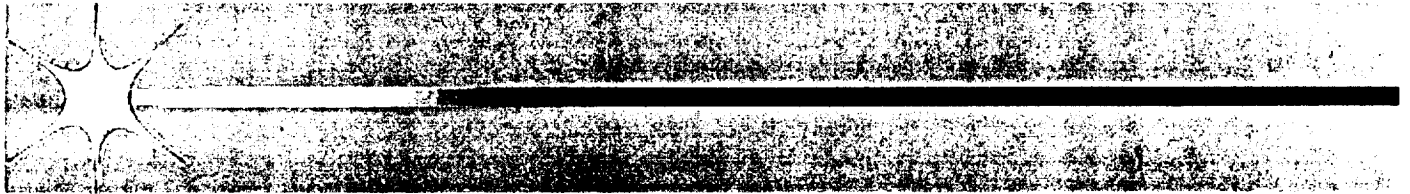


The explosion of net-accessible images and data has unfortunately resulted in two classes of people: the "information elite" who have unlimited free access through their schools or workplaces, or who can afford such access from home; and the "information illiterates" who do not have the hardware or software to tie into the "information superhighway". This projects builds a very important "offramp" so that museum visitors and school children can access these wonderful sources of information with no special training - everything is "point and click". The multimedia programming package "Macromedia Director" is being used, so that the modules can include quicktime movies, images, and sound, all with very rapid, user-chosen, access. All modules have imagery updated automatically in the background so that an up-to-date image is always immediately available to the visitor. (A web-based system is too slow and

confusing for the average visitor, and allows access to inappropriate material; our modules need no attendant). Both "museum versions" and "school versions" of the software are being developed. Both Mac and PC platforms will be supported in the school version (all development is being done on Macs because of ease of programming and powerful multimedia tools).




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The software not only presents archival images (such as images from planetary encounters), it focuses on newly released imagery (such as from Comet Shoemaker-Levy 9). In addition, the modules display automatically-updated imagery, such as hourly weather maps and satellite weather photos, daily images of the Sun in X-ray from Yohkoh and in various wavelengths of light from ground-based observatories. One module characterizes the daily "Space Weather" by presenting real-time information on the hazards of space from programs run at Rice University. These Space Weather "Nowcasts" are based on real-time data from ground-based and space-based observatories.



## GRAND OPENING JULY 20, 1995

Three new computer-based interactive kiosks opened to the public July 20, 1995. They are:

-  Welcome to Planet Earth
-  Space Weather
-  Houston Today

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"Welcome to Planet Earth" highlights Earth resources and Earth weather. Weather maps and satellite weather images are updated hourly. Hurricane tracking charts are updated several times daily in hurricane season. Other imagery, such as bioactivity maps and sea temperature maps, are updated as available (bi-weekly for those two).

"Space Weather" includes real-time predictions of space weather from various online sources; images of the sun from the Solar Data Analysis Center, auroral forecasts from the University of Alaska Poker Flat Research Program and other real-time information on the hazards of space. (The web links given here are more instructive on what is space weather and do not demonstrate the entire space weather kiosk software; contact us for details on how to download the software).

"Houston Today" highlights the Houston area, showing weather graphs and maps from the "WeatherNet2" school-based system of local AWS weather stations (affiliated with KPRC-TV). One of the stations is located at the Museum. The kiosk also shows a real-time video display of the sky from a camera on the museum roof, allowing the visitor to predict the weather using data from the local weather station and the type of clouds visible. It will soon feature Houston's Environmental Information, provided by the Citizens' Environmental Coalition (now available by this web link, and soon available from the kiosk).



### Welcome to Planet Earth

*NOTE:* there are many more images and movies in our museum display than are in this hotlist... our system is a Macromedia system, not a Web system, so most of the movies, etc., are not directly linkable from the Web. In addition, we provide information and explanatory material so that the images are understandable by middle school students (and enjoyable by all).



Space Update has been open to the public since Earth Day 1995. "Space Update" covers all of earth and space science, and is physically located in the museum's Grand Entry hall. The first module which was completed for "Space Update" covers the exciting results of Comet Shoemaker-Levy 9 (SL9), most of which were taken from the JPL SL9 web page. The SL9 module went online in October 1994, and has been updated periodically. Modules for "Planet Earth" and "Space Weather" joined SL9 online for Earth Day 1995.

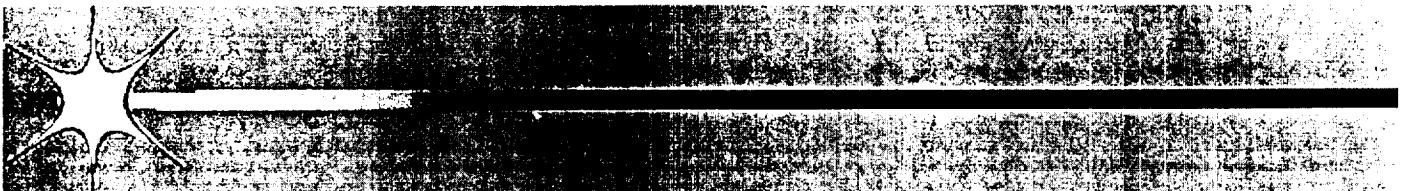
"Astronomy/Astrophysics" was completed January 1996; "The Solar System" will be completed this summer.



[Click here to access the web version of the SL9 module](#)

If you are interested in downloading the Mac or PC version of the full SL9 module, click [here](#).

*(Warning : These are early versions of the software for both 16-bit and 8-bit color monitors, as segmented .SEA files, and a zipped PC-version. The total size, decompressed, is around 12 MB for either version. ) We'll be releasing newer versions as available.*

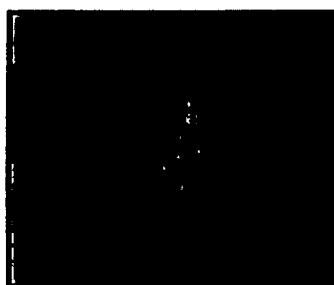


To get a CD-ROM with full single-screen or double-screen versions of our modules, contact Reiff or McKay below. CD-ROMS cost \$30, and include sample imagery (valid the day the CD-ROM was created). Updates to the images in the displays can be obtained in three ways:

- Subscribe to our updating service - we will ftp the images daily to your site (valid only if you have an internet connection)
- Manually download a single file or a whole directory from our anonymous ftp site (a possible solution even for users with a dial-up connection).
- Use a script which we provide to have your computer fetch the files automatically from our server.

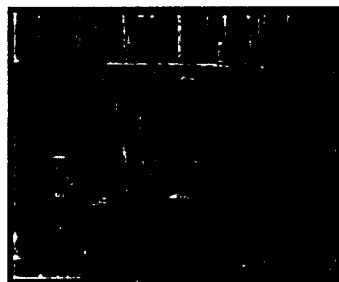


## "Connections" Team Members



Dr. Patricia Reiff

Principal Investigator



Dr. Tamara Ledley

Co-Investigator

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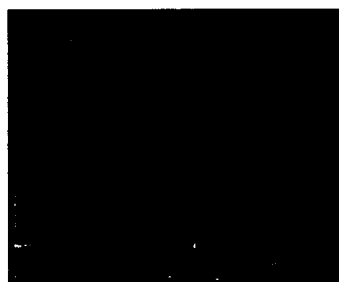
Plus Carolyn Sumners and Ryan Wyatt from the Houston Museum of Natural Sciences, Co-I's.

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Colin Law

Chief Designer



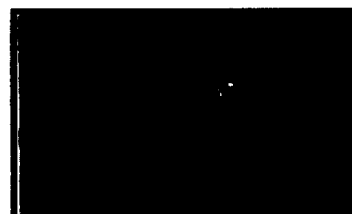
Colin McKay

Project Manager



Ian Smith

Astronomy Guru



B  
S  
E  
G

Email us! Just click our address:

[hmns@space.rice.edu](mailto:hmns@space.rice.edu)

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[Back to the "Connections" main page.](#)

# Creating the Public Connection

## Interactive Experiences with Earth and Space Science Data

Jump to: [Programmatic Summary](#) | [Milestones](#) | [Accomplishments](#)

### Highlights of 1995

In just the first fifteen months of our project, we have accomplished the most critical parts of the program. We are truly bringing to the public:

#### *"Space Views of Earth and Earth Views of Space"*

- "Shoemaker-Levy 9" Exhibit opened to public: October 21, 1994
- School Weather stations come online November 94 - January 1995
- "Connected" planetarium program opens at Museum January 7, 1995
- Full internet access to Museum completed January 10, 1995
- "Space Update" exhibit opened April 21, 1995 (Earth Day)
- First Continuing Studies (adult) course "Surfing the Solar System", Spring 1995
- Demonstrations of modules at AGU, GEM, AAS and IUGG meetings, Summer 1995
- First three "Summer Science Exploration" camps at Museum, Summer 1995
- "Earth Today" exhibit opened July 20, 1995 (Space Week)
- Second Museum comes online (Austin Children's Museum), September 5, 1995
- "Apollo 13" reflight (First Challenger Center Simulation), September 13, 1995
- Preview CD version of software ready to distribute to schools for beta testing, September 14, 1995
- "Live From the Stratosphere", October 12, 1995
- Teacher weather workshops, October, 1995 and January, 1996
- Numerous presentations at NSTA meetings, MATS, SWAP, and AGU meetings, fall 1995.
- "Voyage to the Giants" (Second Planetarium show) began January, 1996.
- "Ask-the-Astronomer" videoconferences began January, 1996.

Jump to: [Programmatic Summary](#) | [Milestones](#) | [Accomplishments](#)

### Milestones

Below is a listing of milestones for "Connections", with a checkmark indicating that the milestone has been met.

Milestone	Date	Met?
Shoemaker Levy-9 Module open to public	10/19/94	✓
Internet connection of Houston Museum of Natural Science complete	01/10/95	✓
First Planetarium show "Connected" opens to public	01/07/95	✓
All Weather stations online (our 4 joined by 11 from Ch. 2)	01/10/95	✓
Workshop for Weather station teachers (at Ch. 2)	01/20/95	✓
First Continuing Studies course	03/29/95	✓
"Space Update" Module open to public	04/21/95	✓



First Summer Student Explorations courses	06/12/95	✓
"Earth Today" triple kiosk open to public	07/20/95	✓
Expansion to second museum (Austin Children's Museum)	09/05/95	✓
"Ask the Astronomer" Spartan 201 internet videoconference	09/8-9/95	✓
First internet "Challenger Center" simulations	09/13/95	✓
"Live from the Stratosphere" Kuyper video uplink	10/12/95	✓
Presentations: Southwest Association of Planetariums, Houston, and NSTA, St. Louis	10/14; 19/95	✓
Second weather workshop (for teachers without stations)	10/23/95	✓
Challenger Center fully internet accessible (test with Rice School)	10/30/95	✓
Presentation to Lanier Middle School	11/27/95	✓
Presentations: NSTA, Baltimore; AGU, San Francisco; NSTA, San Antonio	12/1-16/95	✓
Second Planetarium show begins (Voyage to the Giants)	01/06/96	✓
"Astronomy" module completed and tested	01/8/96	✓
"Ask-the-Scientist" internet videoconferences begun (Cu-SeeMe)	01/15/96	✓
Third teacher workshop (Austin WeatherNet )	01/23/96	✓
Second beta version CD to be ready	02/15/96	-
Expansion to second middle school (Rice School )	03/01/96	-
Expansion to third middle school (Seabrook Intermediate)	04/01/96	-
Expansion to "Electric Space" exhibit (NASA HQ and traveling)	06/01/96	-
More summer camps using internet	06/15/96	-
Expansion to other Museums	07/01/96	-
"Solar System" module to be completed	08/01/96	-
Third Planetarium show, new versions of modules ready	09/01/96	-
Expansion to more middle schools	10/01/96	-
Evaluation and more expansion	10/1/97	-
Submit final report	10/01/98	-

Jump to: [Programmatic Summary](#) | [Highlights](#) | [Accomplishments](#)

## Accomplishments

In our proposal, we stated that we would use NASA data in several venues, including interactive kiosks with access to real-time data, Planetarium shows, summer student courses (summer camps), and Challenger Center simulations. We are pleased to report that we have accomplished at least one example of **all** of these venues, and several of most. We have also performed tasks that we had not specifically proposed to do, but are also well within the purview of bringing NASA data to the public. These include a Rice University "Continuing Studies" course, a lecture to the Rice "Alumni College", numerous live displays of our modules at scientific conferences, and many live teleconferences over the internet (including a teleconference with Spartan scientists during the recent Shuttle mission). Although our project is principally geared for Museums and schools, we

have also put online web versions of many of our exhibits, and they have been extremely popular (our "[Planet Earth](#)" hotlist has made several "top-10" lists). Many thousands of visitors have accessed these pages (averaging 200 non-local hits per day).

In all, our exhibits have been viewed by over **100,000** Museum visitors (at no extra cost) (see "Metrics" below). In addition, the Planetarium show "Connected" (\$2 charge) was seen by approximately **20,000** paying customers (and a second planetarium show "Voyage to the Giants" has just opened). The six-weeks Continuing Studies course had 28 paying adult registrants. The Alumni college lecture was attended by 80 paying adults. The "Space Camp", "Light Speed" and "Geoquest" science camps at the Museum all used one aspect or another of the internet connection, totalling **7333** paying students in summer 1995. Any many students here and around the country have participated in our teleconferences through Cu-SeeMe.

Our kiosks are extremely popular. For the first several months of the SL9 exhibit, we did not have user logging enabled, but the ticket-takers (just opposite the kiosk) said that the exhibit was never empty. One sample week logged in February 1995 showed an average of 315 users a day, with a total of 10,718 images or movies accessed during that week (each visitor averaged 5 links). After "Planet Earth" and "Space Weather" joined SL9 in April 1995, the touches to the SL9 portion alone decreased, but to the system as a whole increased. We estimate more than 100,000 in-person accesses to our modules. For more information on our statistics, see the [metrics page](#). Below are links to specific parts of our project:

- ["Connections" Home Page](#)
- [About the "Connections" Project](#)
- ["Ask-the-Scientist" Internet Videoconferences](#)
- [Module Samplers](#) *Note: abbreviations of Museum versions*
  - [Comet Shoemaker-Levy 9](#)
  - [Welcome to Planet Earth](#)
  - [Space Weather](#)
  - [Houston Today](#)
  - [Space Update](#)
- [Metrics of our Success](#)
- [Our Project in the News](#)
- [Upcoming Projects](#)
- [Houston Museum of Natural Science home page](#)

Jump to: [Programmatic Summary](#) | [Highlights](#) | [Milestones](#)

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[Return to list of DLT projects](#)



[DLT Home Page](#)



[RSD Home Page](#)



[IITA Home Page](#)



[High-Performance Computing Home Page](#)

Maintained by Susan Hoban (HSTX)  
Responsible NASA Official: Nand Lal



## The "PUBLIC CONNECTION" In the News

### *"Earth views of Space and Space views of Earth"*

An Outreach of Rice University  
In partnership with the Houston Museum of Natural Science

# A universe at your fingertips

## NASA-Rice collaboration brings space to museum computer

(Headline from Houston Chronicle article)

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### The First Kiosk in the News

#### Houston Chronicle article October 1994

Our "Shoemaker Levy-9" kiosk went online in the Museum's Grand Hall October 19, 1994, and ran as a single stand-alone touchscreen module until April 21, 1995. The grand opening was the subject of a **Houston Chronicle** article "A Universe at your Fingertips", describing the project. (Click on the thumbnail or the headline to download a jpeg of the article). SL9 was later joined by our modules "Space Weather" and "Planet Earth". The combined module, called "Space Update", opened April 21, 1995, in the same physical kiosk. It continues to serve over 300 visitors per day, whenever the museum is open (till midnight on the weekends).



### Grand Opening, "Earth Today"

#### Frank Billingsley's live weather broadcast from the Kiosk July 19, 1995

The "Earth Today" triple kiosk opened July 20, 1995. It has three independent modules: "Welcome to Planet Earth", "Space Weather" and "Houston Today". "Houston Today" includes real-time data from a local network of 15 school-based weather stations, and will soon include Houston environmental information. Of these, four were paid for from this grant, and 11 from KPRC-TV (NBC Channel 2). Our "Grand Opening" was covered by two local television stations: KPRC and KNWS (Channel 51, an independent news station). The image above shows Channel 2 weatherman Frank Billingsley making his live 6 p.m. weather report from the kiosk on July 19, 1995 (he also did the 5 p.m. weather live from the kiosk).



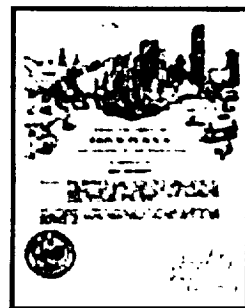
### A young visitor to "Welcome to Planet Earth"

To download quicktime movies of our press coverage, which gives a good view of the triple kiosk in action (warning! large!) click here: [KNWS-TV coverage](#) (3.8MB); or [KPRC 5 pm news](#) (featuring "Space Weather" and "Houston Today") (9.4 MB); or [KPRC 6 pm news](#) (featuring "Planet Earth" and "Houston Today") (8.6 MB).



### Certificate of Recognition

We were delighted to receive, during the grand opening ceremonies, a certificate of recognition from the Houston City Council, presented by Councilman Judge Peavy. Recipients included Rice University, the Houston Museum of Natural Science, and the Public Connection team. To see a copy of one of the certificates click on the icon. Representatives from Senator Phil Gramm's office were also on hand for the festivities..



### The article from "Rice News"

Our project's grand opening of "Earth Today" was featured in a [Rice News](#) article September 27th, 1995. (Click on the thumbnail to download a jpeg of page 1 of the article). Click [here](#) to download a jpeg of the rest of the article.



### Chronicle of Higher Education Article

Our project was also highlighted in a recent "**Chronicle of Higher Education**" story "The Whole World, on a Kiosk" featuring our project (September 22 issue, page A8). (Click on the thumbnail to download the article).



## **Apollo 13 Controllers Aid First Flight of the "Legacy"**

### Apollo 13 Controllers Participate in Historic Mission

In September, we brought the internet to Challenger Center simulations. The Houston Museum of Natural Science premiered a new simulation "Back to the Moon", where the student astronauts and student mission controllers land a space station "Legacy" on the Moon. The first flight of "Legacy" occurred September 13, 1995, with 19 veterans of Apollo 13 (including Flight Director Gene Kranz and Capcom Joe Kerwin sitting in their old seats) helping the students at Mission Control.



### Houston Chronicle article September 14, 1995

The astronauts who flew that day in the "Legacy" were children and grandchildren of the controllers, astronauts and scientists participating in the original Apollo 13. Not surprisingly, we got extensive newspaper, radio and TV coverage of this historic mission. (Click on the thumbnail to download a jpeg of the **Houston Chronicle** article). For page 2, click [here](#). Watch this space for quicktime movies from this press coverage.



## Gene Kranz as Flight Director.

That mission was our first Museum videoconference over the internet, with students at Rice University participating as remote observers of the proceedings. Click Kranz's image or [here](#) to download a jpg screen capture of some of the participants of that first online Challenger Center mission. As a result of that experiment, now students staying at the home schools can watch and participate as their classmates fly in space at the Museum.



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## Live from the Stratosphere

This fall, students in the Museum and across Texas participated in the "[Live from the Stratosphere](#)" Jupiter Flight, October 12, 1995. Twenty students at Houston's Challenger Center Mission Control fielded, sorted, and uplinked live to the Kuiper Observatory questions received by Cu-SeeMe from over 400 students elsewhere in the Museum and at 6 sites around Texas. The scientists and crew onboard the Kuiper (including Rice PhD graduates Al Harper and Bob Loewenstein) then answered their questions (and others from around the country) on live TV, carried nationally by PBS and NASA Select. The project was highlighted in the local press, including most of the local television stations and two web articles "[Face to Face in Cyberspace](#)" and "[Students Soar in Cyberspace at Houston Museum of Natural Science](#)" in the [Houston Chronicle Interactive](#) web site. Channel 13 (KTRK-TV) showed a special segment on their Sunday morning news show. [Click here](#) to download a quicktime movie of that news coverage - but beware! It's 33 MB!

## Ask-the-Scientist Videoconferences

In January we will begin our first online "ask the scientist" videoconferences, with scientists available over the net to interested students. See [our videoconference web page](#) for more information on how to participate. [Email us](#) to get on our videoconference mailing list!

[ABOUT THE PUBLIC CONNECTION](#) | [FIRST YEAR ACCOMPLISHMENTS](#) | [METRICS](#)



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This page has been accessed, according to the [Web Counter](#) folks, at least **6 4 0** times, (by folks with image downloads turned on) since 1 January 1996. (The number may take a few seconds to show up... or may be "BUSY"!)

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[connect@space.rice.edu](mailto:connect@space.rice.edu)



## Metrics of Success for the "PUBLIC CONNECTION"

### *"Earth views of Space and Space views of Earth"*

An Outreach of Rice University

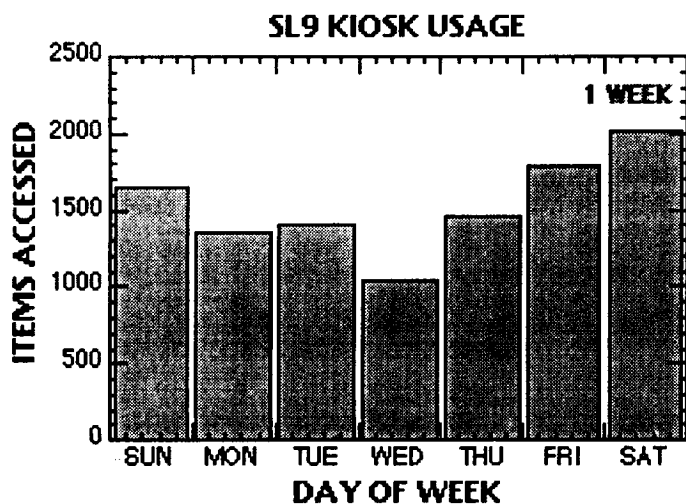
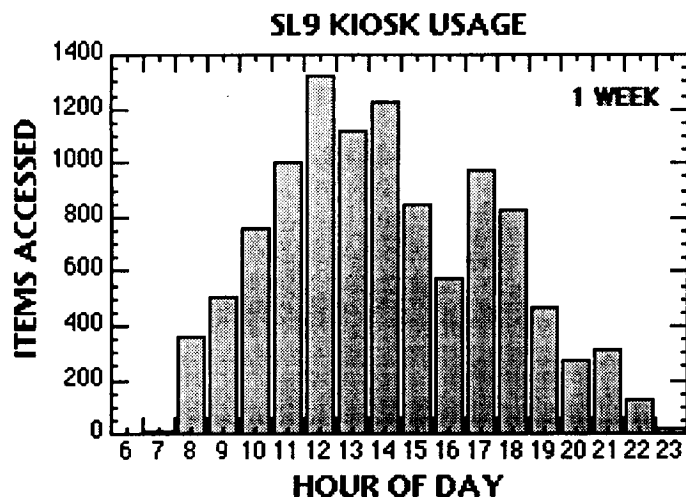
In partnership with the Houston Museum of Natural Science

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In order to assess the vitality of the "Public Connection" project, we have several metrics to apply. We of course want to keep track of the number of people whom we touch with our project. Some are easier to track than others. Some are paying customers for week-long science camps, continuing studies courses, or hourly planetarium programs; some are casual visitors to one of our kiosks. Some visit our program's web pages. Finally (and this will be more important in later years) we will track the number of installed, supported, modules in all locations. At present the number of installed, supported modules is 5; however, counting "live" displays at various meetings and major revisions, the number of modules ever installed is up to 16. Over 50 test CD's are in teacher hands for review.

### **Kiosk Visitors:**

Our "Shoemaker Levy-9" kiosk went online in the Museum's Grand Hall October 19, 1994, and ran as a single stand-alone module until April 21, 1995. This kiosk is freely accessible (without purchasing a ticket) whenever the museum is open, including nights when only the IMAX and planetarium laser shows are playing. One week in that time period, February 13-19, 1995 was fully logged - every visitor and every selection was saved. In that week, we had 2206 visitors with a total of 11,010 items selected (these items were either images of the comet impact from ground or space or movies of the impact and its predicted effects). At that rate, we estimate over **57,000** museum visitors accessed the SL9 exhibit during the time when it was in "stand-alone" mode. Note from the graphs below that even midnight visitors to the rock laser shows learned from our exhibit.



"Space Update" opened April 21, 1995. It had as one selection the SL9 module above, but also "Space Weather" and "Welcome to Planet Earth" as selections. Some of the modules had near-continuous logging; other modules had logging accidentally turned off from time to time as new versions of the programs were installed. The usage of the SL9 portion dropped, but those of the other modules increased. Based on the logs available, it appears that the 300 visitors per day figure for that kiosk was maintained, yielding an estimate of **100,000** visitors to the Grand Hall kiosk for the time period October 19, 1994 - September 15, 1995.

"Earth Today" opened July 20, 1995. It has three independent modules: "Earth Today", "Space Weather" and "Houston Today". "Houston Today" does not yet have active logging; but "Earth Today" and "Space Weather" do. All kiosks appear equally heavily used. These kiosks are only available during standard Museum hours (9 am - 6 pm), and require a standard museum entry fee, but no special charge for this exhibit. Based on the log files available, it appears that 60-80 visitors per day access each of the modules, each person accessing 8-10 items. Thus in the two months since the grand opening, we estimate **12,000** visitors have learned from "Earth Today". (This estimate will improve as we go through the logs more carefully). Our "Grand Opening" was covered by two local television stations (see our "[Project in the News](#)" page) and was featured in a "Chronicle of Higher Education" article. Our "Weather Watch" software was adapted for the Austin region and installed in the Austin Children's Museum on November, 1995. We are discussing with them installing other modules of our software. Our "Space Weather" module has been approved to be part of the "Electric Space" exhibit. This will travel in 1996, and spend a month (June 1996) in the lobby of NASA headquarters. The Weather Watch software may also be a part of the Olympics effort in Atlanta.

## Summer Camp Students:

Three 1995 summer camps at the Houston Museum of Natural Science used the internet access provided by this grant. The "Light Speed" and "Geoquest" science camps both had training sessions on accessing NASA data over the internet. The "Space Camp" students all viewed space images accessed from the internet. In all,

7333 paying students in summer 1995 gained knowledge of NASA from this grant.

## Planetarium Shows:

So far we have had one planetarium show dedicated to how NASA data is obtained over the internet. It ran from January 10 through mid-May, 1995. During that time, it showed to approximately **20,000** paying customers. We have also had more single-shot planetarium shows, including a live "Ask the Astronomer" show during Science and Technology Week, and several Rice University classes given special showings. We anticipate more internet-based planetarium shows in the future.

## Challenger Center Simulations:

We are very proud of our latest accomplishment, bringing the internet to Challenger Center simulations. The Houston Museum of Natural Science has just premiered a new simulation "Back to the Moon", where the students (and student controllers) land a space station "Legacy" on the moon. The first flight of "Legacy" occurred September 13, with 19 veterans of Apollo 13 (including Flight Director Gene Kranz and Capcom Joe Kerwin sitting in their old seats) helping the students at Mission Control, and children and grandchildren of the controllers, astronauts and scientists participating in the mission. Not surprisingly, we got much coverage of this historic mission (see our ["Project in the News"](#) page). Our project brought the internet connection to missions of this type - now not only 40 students at a time can participate, but more students at the home school(s) and "lurkers" around the country can be a part of these missions via videoconferences over the internet. The first such home-school test was done with the Rice School on October 30, 1995; now people from around the country routinely observe and participate in Challenger Center simulations. Thus the impact of the Challenger Center Simulations can be quadrupled with no additional costs to the student.

## "Ask the Scientist" Videoconferences:

We now have online Cu-SeeMe videoconferences, where NASA scientists discuss the results from recent missions. Students from around the country ask questions live and can see the scientist (and be seen!). Lists of questions and answers from the conferences have been generated and will be posted to the net. For more information, see our [videoconference web page](#) and our [videoconference schedule page](#). Images from the Jovian magnetosphere videoconference are given in the [Jupiter magnetosphere web page](#).

## Net Visitors:

Although our project is not a net project per se, we have net version of several of our modules accessible by the Web. In addition, visitors can download simple versions of SL9 module from the net. From March through August 1995, we averaged **235** non-local accesses to our server per day, from many domains in the U.S. and 22 foreign countries. In the most recent month, we averaged 250 non-local net visitors per day. The bulk of the net visitors (up to 200 per day) accessed our most popular ["Planet Earth"](#) hotlist and its imagery. We are now running [Inquisitor](#) (provided by RSPAC) to log web usage and sources of our visitors.

## Adult Programs:

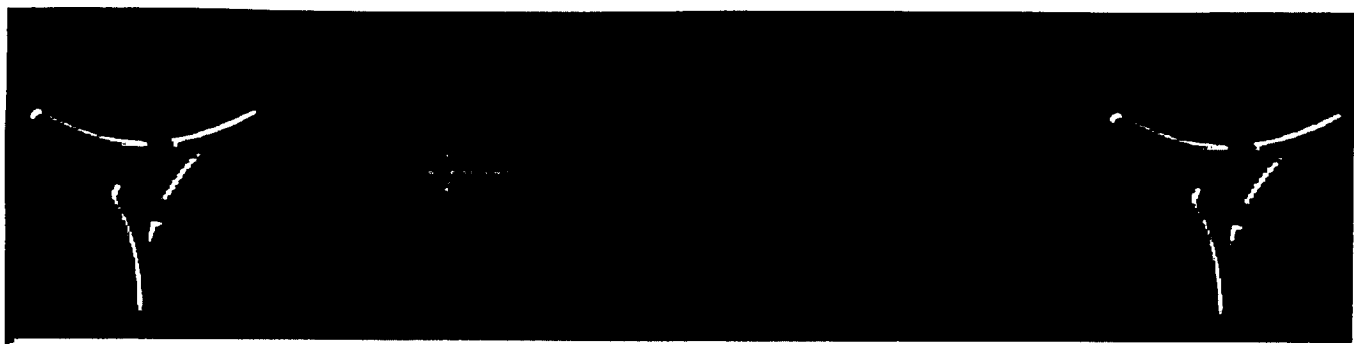
Although our program is geared more for middle school visitors, we have had several programs designed for adults. Our "Continuing Studies" program "Surfing the Solar System" had 28 adults participating in a 6-week course. In addition, Dr. Reiff gave a lecture "Getting Connected: Real-time science over the Internet" to the Alumni college in April, where approximately 80 people attended. Finally, many groups have used the Planetarium's capability to project images from the internet to have interactive displays and video conferences.

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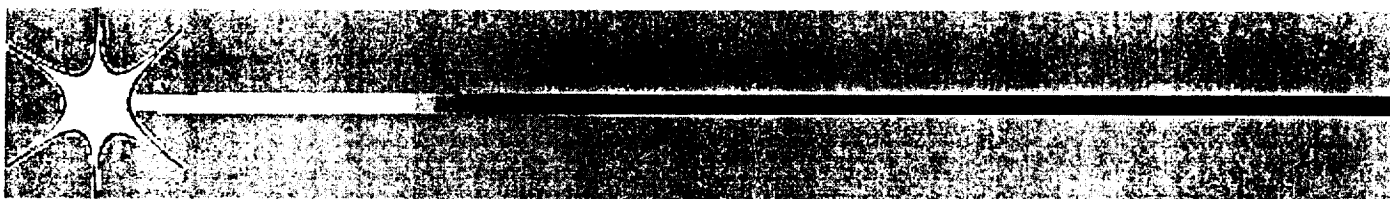




## The "PUBLIC CONNECTION"

### "Ask-the-Scientist" Videoconferences

*"Earth views of Space and Space views of Earth"*



## Join us in Online Videoconferences!

Starting in January, we will offer to schools (and the public) the ability to participate in "ask the scientist" videoconferences. Every week, a scientist will be available for an hour over the internet to answer questions about exciting new discoveries.

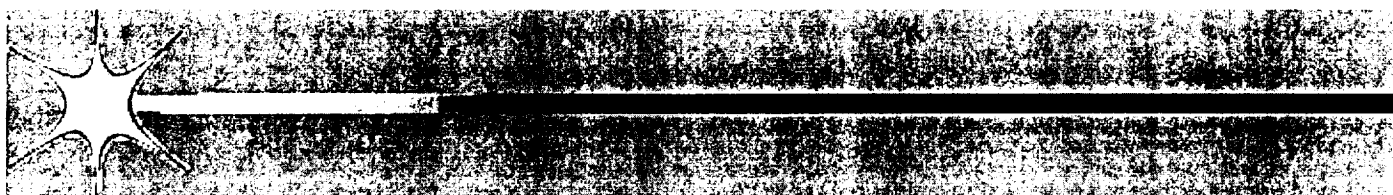
The first conference will highlight global warming, with Dr. Tamara Ledley of Rice University discussing the hottest year on record and how it relates to global warming. Another early conference will present Galileo's entry into Jupiter's magnetosphere (Margaret Kivelson of UCLA will be online). Another January conference will highlight the POLAR spacecraft (due to launch in early February) and its capabilities. Another will discuss the giant magnetic cloud that struck the Earth in October 1995, bringing spectacular auroras to the "lower 48". We are actively seeking scientists to participate in future online interviews, in any area of Space or Earth Science. See the [videoconference schedule](#) for the list of speakers and dates (changing frequently!).



We have successfully performed three video test runs: the first one was with Spartan Scientists during a recent shuttle flight (see [CU-SeeMe SPARTAN 201-3 video conferences](#) - this link also has downloading info for Cu-SeeMe). Our second test was in a Challenger Center [reflight of Apollo 13](#), when we brought back many of the veterans of Mission Control (including Flight Director Gene Kranz and Capcom Joe Kerwin sitting in their old seats) to participate with the children and grandchildren of astronauts and scientists. [Click here](#) to download a jpg of a screen capture from that teleconference, with Rice students observing.



The third and most extensive test run was during the recent "[Live from the Stratosphere](#)" Jupiter Flight, October 12, 1995. Over 200 students in various locations at the Museum and another 300 students at remote sites joined the 30 students in the live uplink to the Kuiper. For more information on that event (including web links to two "[Houston Chronicle Interactive stories](#)" and a 33 MB [quicktime movie](#) of the Channel 13 story of our internet video capabilities, see our "[news](#)" web site.

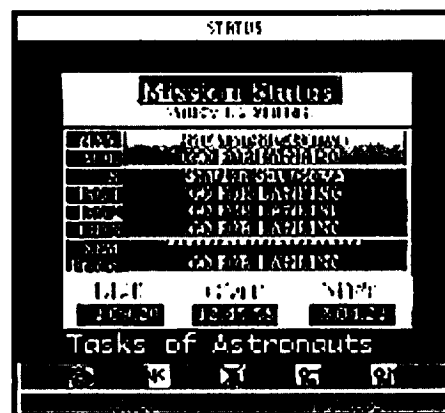


## How to Participate

### To View a Broadcast

First, you need the software. Download the appropriate version of the Cu-SeeMe software using anonymous ftp from [gated.cornell.edu](ftp://gated.cornell.edu) (directory: /pub/Cu-SeeMe), then select Mac.CuSeeMxxxx or PC.CuSeeMxxxx folder as appropriate (present version for mac is 0.83b3). Download the version you need (PPC, 68k or PC); also bring down the README files and the Cu-SeeMe\_Talk file. To "lurk" (watch a broadcast), all you do is start up the software and then CONNECT to an individual's IP number or to the IP number of a reflector site which is hosting the conference. You *can* watch broadcasts over a SLIP connection (14.4 Kb or higher), but the audio will break up from time to time. If you have a slow connection, keep your open windows to a minimum. **WARNING:** The newest power Mac's with "open transport" often don't work with Cu-SeeMe (it connects, opens some windows, then loses the connection). Keep trying, and keep downloading the newest versions of the TCP/IP software patches from Mac.

The Houston Museum of Natural Science's Cu-SeeMe reflector: 198.64.198.250 always has a signal for testing purposes. Anytime during 9:30 - 3 pm CST on weekdays they may have live video from the Museum's Challenger Center. You call tell that it's a Challenger Mission because the "Status" window will say "Mission Status". You may watch a simulation in progress (but please don't participate actively without prior arrangement with Dr. Carolyn Sumners: [sumners@alfven.rice.edu](mailto:sumners@alfven.rice.edu) or Chris Miller (713)639-4631). When no mission is flying, that reflector typically displays NASA Select video (and audio) which you are welcome to view. If you have Apple Quicktime Conferencing, watch the broadcast at 198.64.198.41 for NASA select (in color!) and many of the videoconferences.



### To Participate in a Conference

To ask questions before (or during the conference) you can send email to [connect@space.rice.edu](mailto:connect@space.rice.edu). To actively participate during the conference, you need a camera. The cost is quite modest: if you have an A/V Mac on the 'net and a camcorder, you're set. Even with a modest Mac (LCII or better), you can use a "Quickcam" digital

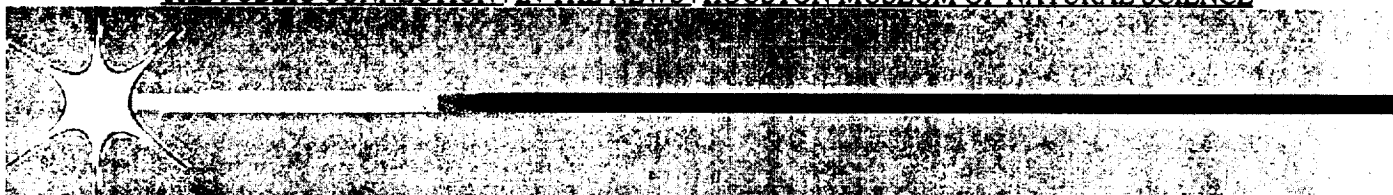
camera (\$99); the camera plugs into a serial port (you can use its mike, but the mike that comes with the Mac works better). When you install the quickcam extension, you must specify the port you will use (NOTE: you can't change it later - so if you are going to SLIP over a phone line, use the camera on the printer port; if you have a direct ethernet connection, you'll probably want to use the modem port). Your own video image should come up automatically when you start up Cu-SeeMe. If not, reduce your monitor depth to 256 and try again. Quickcams are also now available for PC's, but take a bit more effort to set up. Give yourself a name and location using "Preferences". You can adjust the brightness, contrast, etc using the "picture" menu in your settings window (far right icon under \*your\* image).

To connect to a conference, choose "Connect" from the "Conference" pull-down window and specify the IP number of the person or conference you wish to join. The reflector at the Houston Museum of Natural Science is 198.64.198.250. If that doesn't work (or is showing a Challenger Mission), use 128.42.10.16. If you have a slow connection (or if many people are connected), the windows will refresh less frequently. It will automatically give preference to audio transmissions; but they are very resource-hungry so we try to minimize audio. If possible, use the "talk" window (pull down "Show Talk Window" under the "Talk" menu), or use email (to [connect@space.rice.edu](mailto:connect@space.rice.edu)) to ask questions. You can make the most of a slow connection by "freezing" your own image and turning off the audio (click the speaker icon) under all the windows except the scientist's. Use the "talk" window to view (and join into) the discussion. (If the "Talk" menu doesn't show, be sure you have downloaded "Cu-SeeMe Talk" from Cornell and restart Cu-SeeMe). Click in the upper box of the talk window and type there; when you hit "return" the message will be sent to the reflector (and to all the participants) with your name as an ID tag. If you select your video window, what you type will be seen in that window instead. (But it's not a good idea to use that window for conversations - it uses too much bandwidth. Click in that window and hit delete to clear it out.).

## To get on our Conference mailing list

If you are interested in participating, either as an expert scientist or as a teacher whose class would like to ask questions, please send email to [connect@space.rice.edu](mailto:connect@space.rice.edu). We will notify you of upcoming conferences by email. Please let us know the dates and times most convenient for you. Most conferences will run from 12-1 CST, or later in the afternoon if Challenger isn't running. We'll be glad to arrange test conferences to check out your connection and your software. If the conferences get very popular, we will need additional reflectors - let us know if you have a reflector which you would like to link to ours.

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(only counts folks with image downloads turned on) since 1 January 1996. (The number may take a few seconds to show up... or may be "BUSY"!)

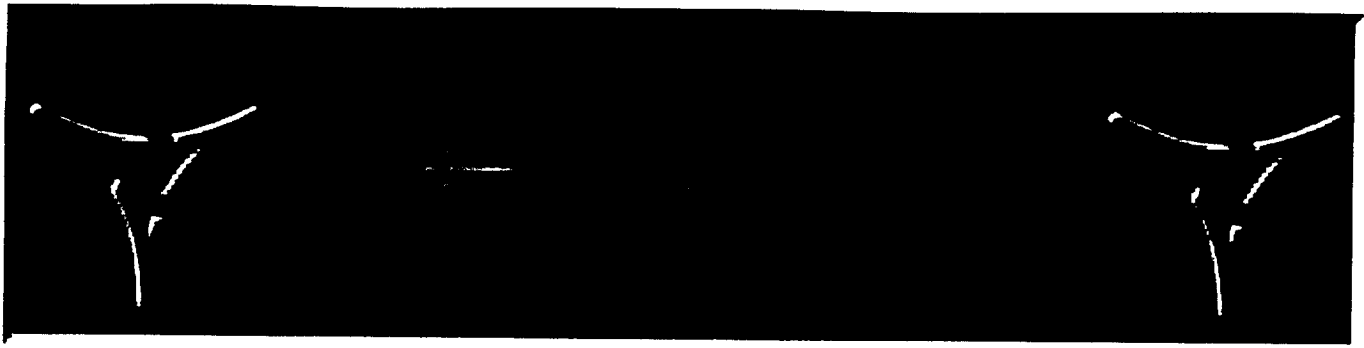
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[connect@space.rice.edu](mailto:connect@space.rice.edu)

An Outreach of Rice University

In partnership with the Houston Museum of Natural Science

Funded by NASA's Digital Library Technology Program



## The "PUBLIC CONNECTION"

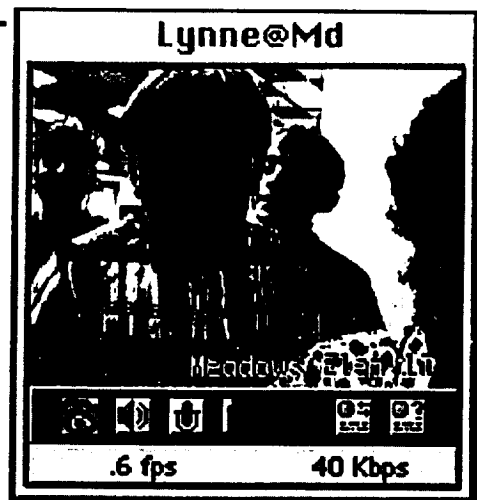
### "Ask-the-Scientist" Videoconference Schedule

*"Earth views of Space and Space views of Earth"*

#### Online Videoconference Schedule

Here is the current "Ask the Scientist" internet videoconference schedule (note: this list may change without notice, because of the governmental furlough and variances in the schedule of NASA launches; also, new speakers are confirmed daily). The reflector will typically be 198.64.198.250; however, if a Challenger Center mission is flying, (you can tell by a "status" window showing "Mission Status"), then use the reflector at 128.42.10.16. (Often, the mission ends at noon CST, so check again just at noon). As always, use the "talk" window (or email to [connect@space.rice.edu](mailto:connect@space.rice.edu)) to ask questions. Please keep audio transmissions to a minimum so that the speaker's audio can get through.

For more information about how you can participate, see our Videoconference homepage. For other Cu-SeeMe NASA Select sites and links to Cu-SeeMe netiquette, see NASA TV. Schools should check out the Cu-SeeMe Schools page, to get on the mailing list!



February 2, 12-1 CST: "The GGS/Polar Mission" (Prof. Patricia Reiff)

February 6, 1-2 CST: "NEAR News Conference" (rebroadcast from NASA Select, opportunity for questions at the end) (NEAR is presently scheduled for February 16 launch from Cape Canaveral)

February 9, 1-2 CST: "GGS/Polar News Conference" (rebroadcast from NASA Select, opportunity for questions at the end) (POLAR is presently scheduled for February 22 launch from Vandenberg)

February 15, 10-11 CST: "*The Dinosaur World*" (Dr. Christopher Cunningham, HMNS)\*

February 16, 12-1 CST: "Space Weather" (scientist to be named)

February (date TBD): "The Tether Mission" (NASA/Marshall)

March 14, 12-1 CST: "Live from Hubble Space Telescope" (student Brian Scott, veteran of "Live from the Stratosphere", the last flight of the Kuyper, will be the online host; the show will be carried live on PBS)

March 21, 12-1 CST: "SOHO Observes the Sun" (Drs. Art Poland and Terry Kucera, Goddard Space Flight Center, and Dr. Vicente Domingo, ESA, LIVE from the SOHO operations center )

March 28, 10-11 CST: "From Fossil Fuels to Future Fuels" (Joel Baruch, HMNS)\*

April 25, 10-11 CST: "Chemistry Connections" (Dr. Carolyn Sumners, HMNS)\*

May 9, 10-11 CST: "A Day in the Life of a Butterfly" (Nancy Grieg, HMNS)\*

\*Sponsored by HEB foods. Lecture only (there may be opportunity for questions at the end). Houstonians may watch these broadcasts live on Channel 8 (KUHT).

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## Previous Teleconferences

January:

January 19, 12-1 CST: "1995 - is Global Warming for Real?" (Dr. Tamara Ledley, Rice)

January 26, 12-1 CST:  
"Galileo - results from  
Jupiter" (Dr. Margaret  
Kivelson, UCLA). For  
figures shown during this  
discussion, link to our  
Jupiter's Magnetosphere web  
page.

According to the Web Counter folks,  
you are visitor number

**363**



(it only counts folks with image downloads turned on) since 1 January 1996. (The number may take a few seconds to show up... or may be "BUSY"!)

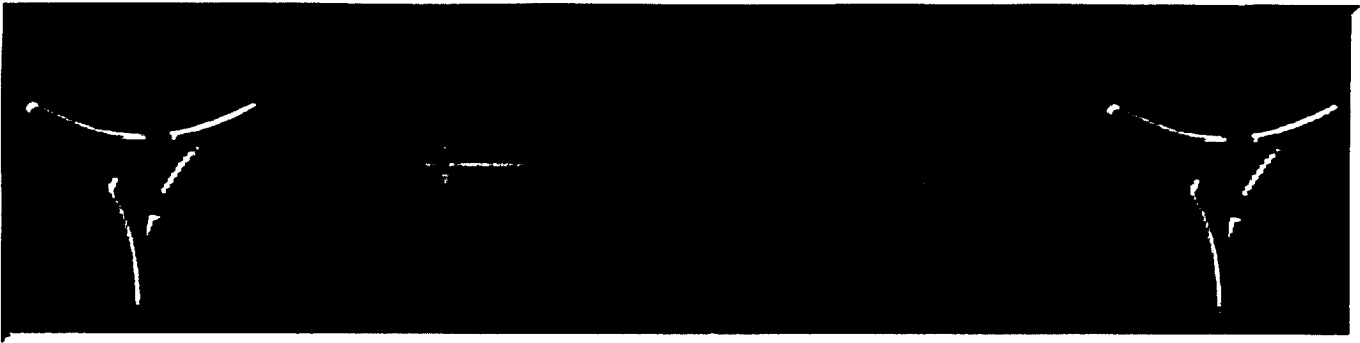
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## The "PUBLIC CONNECTION" Upcoming Activities

### *"Earth views of Space and Space views of Earth"*

An Outreach of Rice University  
In partnership with the Houston Museum of Natural Science

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## Future Activities

(under construction - watch this space)

Our activity level for CY 1996 depends on whether our next-year funds become available to us. Several activities will proceed at a low level even without new resources; but several important expansions and programming efforts cannot proceed without additional resources. It appears, however, that we will be at least partially funded for 1996.

The following activities are planned for this calendar year but depend on receiving new resources:

- Full updating expansion to three middle schools (the Rice School, Lanier Model Lab, and Seabrook Intermediate)
- Complete version of software CD ready for major school distribution
- Expansion to more Museums (Space Center Houston and Chicago Academy of Science)
- "Astronomy" and "Solar System" modules to be completed and installed
- Space Weather kiosk to be designed for new traveling exhibit "Electric Space"

Only our "Ask-the-Scientist" Videoconferences and mailout of prepaid, present-version CD's can continue without new resources. In addition, continuation of the T-1 internet line to the Houston Museum of Natural Sciences (critical for most of our projects) is dependent on receiving new resources. However, it appears that new resources are forthcoming so we should be able to accomplish most of our objectives for 1996.



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